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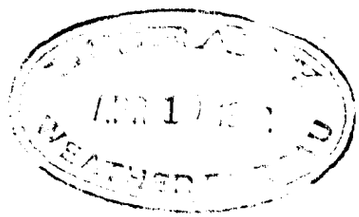
GOVERNMENT OF INDIA

METEOROLOGICAL DEPARTMENT

INDIA WEATHER REVIEW, 1946

ANNUAL SUMMARY



PART C

STORMS AND DEPRESSIONS

CONTENTS

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Under the Direction of

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PART C.

STORMS AND DEPRESSIONS.

I.—DEPRESSIONS AND CYCLONIC STORMS.

During the year 3 cyclonic storms and 13 depressions formed in the Bay of Bengal, 4 cyclonic storms in the Arabian Sea and one depression over south Bengal. The dates of activity of the storms and the greatest barometric depth observed in them are summarised in the table below :—

TABLE I.

Region	Month	Date	Greatest observed barometric depth
Arabian Sea .	June . .	1st — 6th .	17 mbs.
Bay of Bengal .	October .	1st — 7th .	11·8 mbs.
Bay of Bengal .	November .	30th Oct — 3rd Nov.	5·8 mbs.
Arabian Sea .	Do.	4th — 6th .	7·7 mbs.
Arabian Sea .	Do.	5th — 11th .	5·0 mbs.
Bay of Bengal .	Do.	14th — 16th .	7·3 mbs.
Arabian Sea .	Do.	17th — 18th .	12·5 mbs.

The detailed descriptions of these storms and depressions are followed by a list of western disturbances during the year. A list of the more important local storms and the damage caused by them is also added at the end.

1. Shallow Bay of Bengal depression of May 2nd-3rd, 1946.—On the 2nd May morning, the upper winds over Port Blair, Victoria Point, Tavoy and Rangoon indicated a cyclonic circulation over the Andaman sea upto at least 7,000 ft., and the surface isobaric chart suggested the existence of a shallow depression in the north Andaman Sea with central region near latitude 13°N., and longitude 96°E. There was moderate rainfall at Port Blair and along the Tenasserim coast. On the evening of the 2nd, the cyclonic circulation in the upper layers of the atmosphere persisted upto at least 10,000 ft., but a general rise of pressure over the area indicated that the depression was filling up while moving away in a northnorthwesterly direction as a low pressure wave across deltaic Burma by the evening of the 3rd May and became unimportant thereafter. Owing to paucity of observations details of actual weather caused in Tenasserim and deltaic Burma cannot be given.

2. Severe Arabian Sea Cyclonic Storm of 1st to 6th June 1946.—The southwest monsoon advanced as a feeble current into the southeast Arabian Sea on the 28th May and, in association with it, weather was thundery off the Kanara coast on the 29th and 30th. On the 31st, the southwest monsoon burst with its usual vigour on the Malabar coast. Next morning, the upper winds upto 3,000 feet were westsouthwesterly, force 7 over Minicoy and southsouthwesterly, force 7 to 8 over Mangalore, Minicoy was having a negative pressure departure of 3·9 mbs., and conditions were markedly unsettled in the southeast Arabian Sea. By that evening, the Minicoy winds had strengthened further and at 3,000 feet they were southsouthwesterly, force 9, while S. S. Woolwhich at latitude 19½°N., and longitude 69°E., reported a northwesterly wind of force 8. On the morning of the 2nd Minicoy was experiencing rough seas and long swell while the upper winds were blowing with gale to hurricane force from 1,000 to 5,000 feet a. s. l. ; surface winds all along the Malabar coast were reported southeasterly. A ship at latitude 11¾°N., and longitude 71¾°E., reported southsouthwesterly wind of force 6 while another at latitude 13°N, and longitude 68°E., reported northnortheasterly wind of force 3. The pressure departure at Minicoy was—5·3 mbs. A deep depression had formed with centre at 08 hrs. within half a degree of latitude 11½°N., and longitude 71°E. The evening chart of the same day (i.e. 2nd) showed a rise of pressure along the Malabar coast and a fall of pressure further north, and the upper winds over Minicoy had also strengthened further. The depression had moved northwestwards and became a cyclonic storm centred at 17 hrs. near latitude 13½°N., and longitude 70°E. The storm continued to move northwestwards and on the morning of the 3rd, it was centred near latitude 14½°N., and longitude 68½°E. It had moved so far away from the coast that pressure rose along the whole of the west coast and a part of the monsoon air which had got out of its inner circulation flowed towards the Malabar coast and increased the rainfall there, Mangalore reporting 4" and Calicut 2" on 3rd. The position of the storm centre at 14 hrs. I. S. T. on the 4th could be fixed with certainty at latitude 17½°N., and longtitude 65½°E. by the reports of the ships S. S. Stratheden and S. S. Georgic. S. S. Stratheden was proceeding from Bombay towards Aden and was at latitude 18°N., and longitude 65°E. It reported southwesterly winds of force 10 and heavy continuous rain. S. S. Georgic which was travelling in the opposite direction was at latitude 18½°N., and longitude 64½°E., and reported northerly winds of force 10. These reports showed that the storm was severe with winds of force 10 and more around the centre to a distance of at least 40 miles.

The storm thereafter gradually curved to westnorthwest and was centred near latitude 19°N., and longitude 62°E., on the morning of the 5th. By the 6th morning it had weakened into a deep depression and was centred near latitude 19½°N., and longitude 60½°E., and by that night weakened further into a trough of low pressure off southeast Arabia. It became unimportant during the course of the next day.

From the ships' reports, it could be inferred that the track of the storm was marked by heavy rainfall.

3. Bay depression of 1st to 6th July, 1946.—On the morning of the 1st July, appreciable fall of pressure was observed round the head of the Bay and the surface isobaric chart as well as the upper wind circulation upto 2 km., indicated that the monsoon trough had extended into the north Bay where conditions were becoming unsettled. By the next morning, a shallow depression had formed with its central region at 08 hrs. near latitude 20°N., longitude 91°E. On the morning of the 3rd, pressures had risen along the east Bengal coast while they continued to fall along the west Bengal-Orissa coast and the shallow depression had moved westnorthwestwards and was centred at 08 hrs. near latitude 21½°N., and longitude 88½°E. The depression then rapidly moved inland and lay as an extended 'low' stretching from north Orissa to the north Central Provinces on the morning of the 4th. The 'low' shifted northwestwards slowly becoming more and more diffuse and became unimportant by the 6th morning.

The depression caused widespread and locally heavy rain in Orissa, south-west Bengal, the Central Provinces and Berar and west Central India. The particularly heavy falls of rain are given in the following table.—

TABLE 2.

District	Particularly heavy falls.
ORISSA	
Puri . . .	1st, Kanas 9·1″ ; 3rd, Banpur 5·3″ ; 3rd, Coy 6·4″, Puri 5·8″.
Dantewara sub-division (Bastar States).	4th Bhopalpatnam 3·1″.
BENGAL	
Jalpaiguri . .	1st Buxa 7·8″.
Darjeeling . .	1st, Mongpoo 6·3″.
CENTRAL INDIA	
Indore . . .	5th, Indore 9·1″, Depalpur 5·0″, Mhow 5·5″.
Bundelkhand . .	3rd, Chhatarpur 5·4″.
CENTRAL PROVINCES AND BERAR	
Drug . . .	4th, Bemetara 5·2″.
Chanda . . .	4th, Garchiroli 5·9″.
Balaghat . . .	4th, Waraseoni 8·1″, Dongargaon 5·7″.
Akola .	5th Basim 5·1″, Sirpur 6·7″.
Amraoti	5th, Barur 5·3″.
Yeotma	5th, Darwha 8·1, Digras 5·1, Ner 5·5″.

4. Land depression from the 13th to the 15th July 1946.—The axis of the monsoon trough of low pressure was lying close to the foot of the eastern Himalayas from the 8th of July and the activity of the monsoon was confined to the region from the United Provinces to Assam. On the 11th morning, a low pressure wave was approaching Assam from the east and a general fall of pressure over northeast India was noticed, the largest defect of pressure on the 12th morning being over south Bihar. Pressure continued to fall in northeast India for the next 24 hrs., the fall being a maximum along and near the line joining Gaya to Noakhali. The monsoon trough was evidently re-establishing over the Gangetic plain. By the morning of the 13th, a trough of low pressure had formed extending from south Bihar to the northeast angle of the Bay of Bengal. This trough concentrated into a depression centred at 17 hrs. I. S. T. of the 13th about 30 miles south of Burdwan. Moving slowly northwards, it was centred between Burdwan and Asansol on the 14th morning. Taking a northwesterly course thereafter the depression was centred about 50 miles southeast of Gaya on the 15th morning and between Gaya and Daltonganj on the same evening. It weakened thereafter and became unimportant by the 17th.

This land depression stimulated the activity of the monsoon in Bihar, Chota Nagpur, Orissa and south Bengal where widespread and locally heavy rainfall occurred between the 13th and the 15th. It also caused an extension of rainfall into east Central India and the northeast Central Provinces. Some of the particularly heavy rainfall associated with this depression are given in the following table :

TABLE 3.

District	Particularly heavy falls.
BENGAL	
Dacca . . .	13th, Munshiganj 5·1″.
BIHAR	
Gaya . . .	14th, Sherghati 5·5″ ; 15th Aurangabad 5·0″.
Shahabad . .	12th, Agcaon 5·9″, Koati 6·0″.
CHOTA NAGPUR	
Hazaribagh . .	15th, Bagodar 9·7″.

5. Bay depression from the 19th to the 24th July 1946.—On the morning of the 19th July, the monsoon trough of low pressure had extended into the west central Bay of Bengal off the Circars coast. Pressure continued to fall along the Circars coast and on the morning of the 20th, a shallow depression had formed with centre near latitude 17½°N., and longitude 87°E. Without appreciable intensification, the depression moved northwards and was centred near latitude 18½°N., and longitude 87°E. at 08 hrs. on the 21st. Continuing to move slowly northwards it was centred near latitude 19°N., and longitude 87°E. at 08 hrs. on the 22nd and near latitude 20°N., and longitude 87°E., at 08 hrs. on the 23rd. The depression crossed the coast near Chandbali in the early hours of the 24th, moved northwestwards and lay over the extreme north of Orissa at 08 hrs. on that day. Continuing the northwestward course, it lay as a diffuse 'low' over Chota Nagpur and the northeast Central Provinces on the morning of the 25th, persisted over that area till the 27th and then became unimportant.

In association with this depression, widespread and locally heavy rainfall occurred in Orissa, the Central Provinces and the adjoining parts of Central India on the 23rd and the 24th. Some of the noteworthy amounts of rainfall are :

TABLE 4.

District	Particularly heavy falls.
ORISSA	
Sambalpur . .	23rd, Dhama 5·1″.
Bhanupratappur (Chattisgarh State).	24th, Bhanupratappur 5·1″.
Bhopalpatnam (Bastar State).	24th, Bhopalpatnam 5·7″.
CENTRAL PROVINCES	
Drug . . .	23rd, Gandai 5·1″.
Chanda . . .	24th, Bemetara 5·0″.
Nagpur . . .	24th, Nagpur 5·1″, Ramtek 5·7″.
Yeotmal . . .	24th, Darwha 7·3″.

6. Shallow Bay depression from the 26th to the 29th July 1946.—On the morning of the 26th, a trough of low pressure extended from Chota Nagpur and the northeast Central Provinces to the northwest angle of the Bay of Bengal. The monsoon was also generally strong practically over the whole of the north and central Bay of Bengal. On the 27th morning, a depression of small extent formed close to the coast with centre near Balasore. The depression crossed the coast by the same evening and, moving rapidly westnorthwestwards, accentuated the residual 'low' of the previous depression of the 14th to 24th July, so that a low pressure area lay over the north Central Provinces and the east United Provinces on the morning of the 28th. The low pressure area while shifting westnorthwestwards became unimportant over west Central India by the 30th.

This depression following closely after the previous one, stimulated the activity of the monsoon in northeast India and the two together were responsible for widespread and locally heavy rain in Orissa, the north Madras coast, the Central Provinces and the adjacent areas of Central India. The particularly heavy falls of rain are given in the following table :

TABLE 5.

District	Particularly heavy falls.
ORISSA	
Sambalpur . .	28th, Dhama 9·7″.
Janakpur (Chattisgarh State.)	26th, Janakpur 5·0″.
CENTRAL INDIA	
Bhind (Gwalior State)	26th, Lahar 5·5″.
Goona (Gwalior State)	28th, Chachaura 6·1″.
Bhilsa (Gwalior State)	28th, Haidergarh Basoda 5·9″.

TABLE 5—*contd.*

District	Particularly heavy falls.
CENTRAL INDIA—contd.	
Shajapur (Gwalior State)	28th, Shajapur 6·9″.
Sardarpur (Gwalior State)	26th, Sardarpur 6·1″, 27th, Manawar 6·9″.
Indore (Indore State)	26th, Manpur 7·5″ ; 27th, Depalpur 6·8″; Mhow 6·0″.
Nimar (Indore State)	27th, Burwaha 6·0″ ; Mahteshwar 5·5″.
	28th, Burwaha 6·5″ ; Maheshwar 5·6″.
Eastern Dt. (Bhopal State)	28th, Chiklod 5·2″ ; Kaliakhai (Goharganj) 5·1″ Raesen 6·1″ ; Sultanpur 5·7″ ; 29th Udaipur 5·4″.
Western Dt. (Bhopal State)	28th, Berasia 7·1″ ; Bhopal 5·5″ ; Doraha 8·1″, Sehore (Qasba) 5·4″ ; 29th Doraha 5·3″.
Narsingarh (Bhopal Agency)	28th, Narsingarh 5·9″, Chhapera 5·4″. 29th, Narsingarh 5·3″, Chhappera 5·9″.
Rajgarh (Bhopal Agency)	27th, Biaora (Tehsil) 5·6″, Kotra 7·6″. 28th, Biaora (Dispensary) 8·7″, Kotra 7·2″ Biaora (Tehsil) 6·3″.
Makrai (Bhopal Agency)	26th, Makrai 6·4″.
Mohamadgarh (Bhopal Agency)	26th, Jhabwa 6·6″, Rambapur 6·5″, Dhar 6·4″. 27th, Mandu 7·3″ ; 28th, Mohamadgarh 6·3″ ; 29th Mohamadgarh 5·7″.
Southern Rewa (Rewa State)	26th, Pushparajgarh 5·1″.
Bundelkhand . .	29th, Chattarpur 5·2″, Orchha 5·7″.
CENTRAL PROVINCES	
Saugor . . .	27th, Hatta 5·1″.
Balaghat . . .	26th, Lanji 6·3″, Waraseoni 6·5″, Warmain 8·5″.
Hoshangabad . .	27th, Harda 5·5″.
Nimar . . .	27th Khandwa 5·6″, Harsud 5·7″, Mandhata 5·3″.
Betul . . .	27th, Bhainsdehi 6·2″.
Amraoti . . .	27th, Ellichpur (Cantt.) 5·0″, Chikalda 5·1″.

7. Bay depression from the 31st July to the 6th August 1946.—On the morning of the 31st July a feeble cyclonic circulation appeared over the head of the Bay of Bengal and an appreciable fall of pressure was noticed in and around Orissa-Bengal coast. By the same evening, conditions became markedly unsettled in the north Bay and a cyclonic circulation had established itself in the upper air upto 10,000 feet. The unsettled conditions concentrated into a depression in the course of the night and at 08 hrs. of the 1st, the depression was centred near latitude 21°N., and longitude 88½°E. Moving northwestwards, it crossed the coast to the north of Balasore in the forenoon of the 2nd. Continuing to move in the same direction, it was centred near Jamshedpur at 17 hrs. of 2nd. Thereafter it took a more w ester y course and was centred about 100 miles northeast of Pendra on the 3rd morning, near Guna on the 4th morning and between Jodhpur and Deesa on the 5th morning by which time it had considerably weakened. By the next day, it merged into the seasonal 'low' over Baluchistan.

Under the influence of this depression, the monsoon became strong to vigorous over the Konkan, Gujarat and the central parts of the country. The depression was also responsible for the extension of monsoon into Rajputana and Sind.

Some of the noteworthy falls of more than 5″ associated with depression are given in the following table :

TABLE 6.

District	Particularly heavy falls.
BOMBAY (GUJARAT)	
Panch Mahals . .	5th, Jhalod 5·9″.
Broach . . .	4th, Hansot 12·1″ ; Ilav 10·4″.
Surat . . .	3rd, Whagai 6·1″ ; 4th, Surat 5·6″, Olpad 5·0″ 4th, Mandvi 5·8″, Bardoli 6·3″, Valodi 9·2″ Jalalpor 5·0″, Chikli 8·1″, Bulsar 7 3″ Wagai 8·4″, Ahwa 6·6″.
Savantvadi (State) .	3rd, Amboli 6·7″.
Kolhapur (State) .	2nd, Gagan Bavada 5·3″.
Lunavada (State) .	5th, Lunavada 5·3″.
Dharampur (State) .	3rd, Dharampur 8·1″, 4th, Dharampur 6·8.
Bansda (State) . .	3rd, Bansda 5·4″ ; 4th, Bansda 10·2″.
Baroda (State) . .	3rd, Songadh 5·9″. 4th, Navsari 5·7″, Mongrol 8·3″, Songadh 3·5″
Tharad (State) . .	4th, Tharad 12·5″.
BOMBAY (KONKAN)	
Thana . . .	3rd, Kalyan 6·2″ ; Murbad 6·0″.
Kolaba . . .	2nd, Matheran 6·4″ ; 3rd, Matheran 9·3″.
CENTRAL PROVINCES	
Chanda . . .	2nd, Ahiri 6·5″.
Bhandara . .	1st, Deori 6·4″.
Hoshangabad . .	1st, Narsinghpur 5·8″.

8. Deep Bay depression from the 5th to the 10th August 1946.—The movement of a low pressure wave from north Burma towards the north Bay of Bengal was evident from the 17 hrs. chart of the 4th, when pressures were falling in southeast Bengal and the Arakan coast and pressure departures were negative in the same region. By the 5th morning, the low pressure wave had moved into northeast Bay and a shallow depression had formed there with central region at 08 hrs. near latitude 20½°N., longitude 89½°E. By 17 hrs. of the same day the depression had become fairly deep. Saugor Island recorded 3″ of rain between 08 and 17 hrs. of the 5th and S. S. Elstree Grage and Masimpur which were more than 150 miles away from the centre of the depression reported westsouthwesterly winds of force 7 and 6 respectively. Deepening further the depression moved northwestwards and was centred at 08 hrs. of the 6th near Saugor Island which was having a negative departure of 6·8 mbs and had recorded 5″ of rain during the previous 24 hours. The deep depression crossed the coast between Balasore and Calcutta in the course of the day and lay at 17 hrs. over Chota Nagpur with its centre about 70 miles westsouthwest of Ranchi. By the next morning, it had intensified further and was centred near Umaria. Heavy rain had fallen at many places in the east Central Provinces and at 08 hrs. the associated rain-belt extended from the northeast Central Provinces to west Central India.

The deep depression continued to move westnorthwestwards and was centred 30 miles north of Guna on the 8th morning, stations in west Central India and southeast Rajputana having recorded heavy amounts of rainfall. Thereafter, it weakened and curving towards northwest was centred near Gwalior at 08 hrs. of the 9th. Weakening further and moving slightly northeastwards, it became unimportant by the next day.

The depression was responsible for widespread and locally heavy rain in Orissa, southwest Bengal, the northeast Central Provinces, west Central India and east Rajputana. The district averages and some of the note-

worthy amounts of rainfall associated with the depression are given in the following table :

TABLE 7.

District	District averages on			Particularly heavy falls.
	7th	8th	9th	
ORISSA				
Sambalpur	..	..	..	6th, Nawapara 5·4″ ; 7th Padmapur 5·2″.
Puri	..	..	..	7th, Pipli 6·6″.
RAJPUTANA				
Sambhar	..	2·1	..	
Ajmer-Merwara	..	..	..	7th, Jawaja 5·3″.
Kotah	..	3·1	2·9	8th, Mongrol 9·3″ ; Abu 6·4″ Krishenganj 5·6″. 9th, Mongrol 6·3″ ; Itawah 5·2″ Antah 5·3″.
CENTRAL INDIA				
Gwalior State				
Shivpuri	2·4	..	..	7th, Pichore 5·0″.
Goona	4·0	..	..	7th, Goona 5·3″.
Indore State				
Rampura-Bhanpura	4·4	2·3	..	7th, Manasa 6·5″.
Mahidpur	2·0	..	..	
Bhopal Agency				
Rajgarh	2·1	..	..	
Khilchipur	3·4	2·4	..	
Pathari	2·6	..	..	
Mohamedgarh	..	2·0	..	
Rewa State				
Southern Rewa	2·4	..	..	
CENTRAL PROVINCES				
Drug	2·2	..	..	
Raipur	3·0	..	..	7th, Lakholi 7·2″ ; Pithora 6·1″ Kurud 5·4″ ; Mahasamund 5·2″; Kusrangi 5·0″.
Bilaspur	2·8	..	..	7th, Khotaghat 5·1″ ; Pendra 5·1″.
Saugor	..	3·2	..	8th, Garhakota 5·8″.
Jubbulpore	2·3	..	..	
Mandla	2·9	..	..	

9. Depression of 16th to 21st August 1946.—On the morning of the 16th August, the monsoon trough extended into the head of the Bay and a cyclonic circulation was noticed upto about 7,000 feet a. s. l. over the region which indicated that the conditions had become unsettled over the north Bay. During the next 24 hours, the unsettled conditions developed into a depression centred at 0800 hrs. I. S. T. of 17th near latitude 20°N. and longitude 90°E. Without any further intensification, the depression moved westwards and was centred at 08 hours I. S. T. of 18th near latitude 20°N., and longitude 88°E. Continuing its westerly course, it crossed the Orissa coast near Chandbali by the same evening and then moved northwest, being centred at 08 hours I. S. T. of 19th about 70 miles to the west of Balasore. Thereafter it weakened into a trough of low pressure in the course of its movement northwestwards and finally became unimportant over the east Central Provinces on the 21st. In association with this depression, fairly widespread moderate to heavy rain fell in Orissa on the 18th and 19th and in Assam on 19th. Fairly widespread rain with locally heavy falls also occurred in the Central Provinces and Central India between the 19th and 21st.

Table showing noteworthy district averages of rainfall and amounts of particularly heavy falls.

TABLE 8.

District	District averages on				Particularly heavy falls.
	18th	19th	20th	21st	
ORISSA					
Angul	..	..	..	..	19th, Angul 6·7″.
Puri	..	..	..	..	19th, Gop 5·9″.
ORISSA (STATES)					
*Baramba	3·0	..	..	..	
*Rairakhol	..	3·6	..	..	
*Bamra	..	4·4	..	..	
*Nayagarh	2·7	..	..	..	
*Pallahara	..	..	3·7	..	
*Ranpur	..	3·7	..	..	
*Talcher	3·2	..	..	..	
*Khandpara	..	3·3	..	..	
*Tigiria	..	3·3	..	..	
CENTRAL INDIA					
Gwalior	..	..	..	..	19th, Basoda 6·1″.
Bhopal	..	..	2·4	..	20th, Udaipura 6·3″, Narsullaganj 5·3″.
Bhopal Agency	..	..	..	..	20th, Mohamedgarh 8·3″.
CENTRAL PROVINCES					
Bilaspur	..	..	..	..	19th, Janjgir 5·2″. 21st, Janjgir 5·4″.
Chanda	..	3·2	..	..	19th, Garchiroli 5·3″. Sindewahi 8·0″. Gurmusi 8·0″. 20th, Ghorajheri 6·0″.
Hoshangabad	..	..	2·5	..	20th, Godarwara 5·1″.

*One station only in the district.

10. Bay depression from the 4th to 11th September 1946.—The morning upper winds of the 3rd September showed that weather in the north Andaman Sea was slightly unsettled and this became more marked on the 4th morning. Port Blair was reporting northwesterly wind and moderate rain and stations along the Tenasserim were reporting southerly winds and rain, while Rangoon was experiencing northerly wind and heavy continuous rain. These unsettled conditions apparently shifted to the northeast Bay of Bengal by the morning of the 6th but the actual movement could not be followed through all the stages owing to lack of observations. A weak cyclonic circulation was also seen over the Central Bay of Bengal on the 4th morning and this also shifted northwards The advance of a feeble low pressure wave from upper Burma towards the north Bay was noticed on the charts of the 5th morning. Probably the above systems coalesced to form a depression on the 6th morning centred at 08 hrs. I. S. T. near latitude 20°N., and longitude 90°E. At 17 hrs. of that day, the centre of the depression was near latitude 21°N., and longitude 88½°E. Sandheads was at that time reporting northnorthwesterly wind, force 6, and heavy rain, while the wind at Saugor Island was northeasterly, force 5. Moving practically westwards, the depression crossed the coast between Chandbali and Balasore during the early hours of the 7th and was centred about 50 miles northeast of Cuttack at 08 hrs. of that day. Thereafter the depression weakened, but continued to move westwards and was centred about 70 miles south of Champa on the 8th morning and between Nagpur and Chanda on the morning of the 9th. It then curved towards northwest and was centred about 50 miles southeast of Dohad on the 10th morning. By the next morning, it became unimportant. After the 7th, the depression was very shallow as was evident from the isobaric chart but the cyclonic circulation in the upper air continued to be well marked.

Associated with the movement of this depression, widespread and locally heavy rain fell in Orissa, the Central Provinces, the Konkan, the Bombay Deccan and east Gujarat. Rainfall was very heavy and intense on the 9th along the Konkan coast and on the 10th in east Gujarat, Bombay experiencing a downpour of 9″ in less than five hours. According to newspaper reports, the heavy rains in the Bombay city caused considerable dislocation of traffic and damage to buses and trams. In the Kolaba district, a 200 feet long bridge across the Bhagwati river collapsed due to the rains.

Some of the noteworthy district averages of rainfall and particularly heavy falls associated with this depression are given in the following table:

TABLE 9.

District.	District averages on			Particularly heavy falls.
	9th	10th	11th	
ORISSA				
Cuttack	..	..	..	7th, Rajkanika 7·1″, 8th Bantala 5·2″.
Balasore	..	..	..	7th, Eram (Basudevpur) 6·3″.
CENTRAL PROVINCES.				
Raipur	..	..	..	8th, Pithora 6·6″, Batagaon 7·0″.
Wardha	2·1	..	..	
BOMBAY				
Broach	..	4·2	2·2	10th, Broach 9·9″, Ankleshwar 5·9″, Hansot 5·7″, Ilav 8·9″.
Surat	..	5·8	4·4	10th, Surat 6·1″, Olpad 5·5″, Mandvi 6·7″ Bardoli 5·7″, Valod 7·1″, Pardi 5·8″, Waghai 9·4″, Ahwa 6 2″. 11th, Olpad 6·1″, Bardoli 5·4″, Jalalpar 6·3″ Chihkli 6·7″ Bulsar 5·2″, Pardi, 6·4″.
West Khandesh	..	..	..	9th, Nevapur 6·4″.
East Khandesh	..	2·3	..	10th, Chalisgaon 5·1″.
Nasik	..	3·8	..	10th, Nandgaon 7·8″, Peint 5·6″ Bolthan 6·0″.
Ahmednagar	2·8	..	..	9th, Mirajgaon D 6·5″.
Poona	..	..	..	9th, Lonavala 8·3″.
Thana	..	3·0	..	
Bombay*	8 6	2·2	..	9th, Bombay 8·6″.
Bombay Suburban*.	5·2	2·8	..	9th, Kurla 5·2″.
Kolaba	5·7	4·1	..	8th, Uran, 5·2″. 9th, Panvel 6·8″, Uran 9·2″ Karjat 6·8″ Matheran 9·2″ Pen 6·3″, Roha 5·3″. 10th, Uran 5·3″, Pen 6·9″.
Ratnagiri	5·6	2·8	..	9th, Ratnagiri 7·7″, Devgad 5·1″ Rajapur 5·8″, Sangameshwar 9·7″, Chiplun 7·1″, Guhagar 7·2″, Dapoli 7·1″, Lanja 7·2″. 10th, Chiplun 5·4″.
BOMBAY STATES				
Savantvadi	2·7	2·1	..	
Kolhapur	..	..	..	9th, Gaganbavada 9·2″.
Rajpipla	..	3·1	..	
Dharampur	..	..	..	10th, Dharampur 7·1″; 11th, Dharampur 5·3″.
Sachin	..	..	..	9th, Sachin 6·4″.
Bansda	..	..	..	10th, Bansda 9·4″.
Navsari (Baroda State)	..	5·9	2·6	10th, Navsari 5·5″, Mangrol 5·7″ Songadh 6·2″; 11th, Navsari 6·0″.

*One station only in the district.

11. Bay depression from the 9th to the 16th September.—The synoptic charts for 17 hrs. of the 8th of September indicated that weather was again unsettled in the north Andaman Sea and neighbourhood. Tavoy was reporting southeasterly surface winds and moderate continuous rain, while Port Blair was also raining. The 08 hrs. chart of the 9th morning showed a 'low' moving westwards into north Andaman Sea across Tenasserim. Simultaneously, a low pressure area was moving across upper Burma towards northeast Bay of Bengal. By the morning of the 10th, the 'low' from upper Burma had moved into the northeast angle of the Bay and the 'low' from the Andaman Sea had moved into northeast Bay of Bengal and the adjoining parts of East Central Bay of Bengal. By 17 hrs. of the same day i.e. of the 10th, the two low pressure systems had coalesced into one elongated depression with central region near latitude 22½°N., longitude 89½°E. Very heavy rain had also fallen along the Chittagong coast, Cox's Bazar recording 6″ between 08 hrs. and 17 hrs. of the 10th. Moving rapidly westnorthwestwards, the depression lay over Chota Nagpur centred about 50 miles south of Daltonganj on the morning of the 11th. Next morning it was centred between Sutna and Jubbulpore and rainfall had extended to Central India and the north Central Provinces. Continuing to move in the same direction and slightly intensifying at the same time, the depression was centred near Guna on the 13th morning and about 60 miles northeast of Kotah on the 14th morning. Thereafter, it curved towards northeast, weakened rapidly and filled up over the west United Provinces by the 16th morning.

The depression was responsible for wid spread and locally heavy rain in northeast India, the north Central Provinces, Central India, east Rajputana and the west United Provinces.

The noteworthy district averages of rainfall and amounts of particularly heavy falls are given below:

TABLE 10.

District	District averages on				Particularly heavy falls.
	12th	13th	14th	15th	
ASSAM					
Lushai Hills	..	..	..	..	12th, Kolosib 5·2″.
BENGAL					
Jalpaiguri	..	..	..	..	11th, Alipore Duara 5·2″.
Pabna	..	..	..	..	9th, Shazadpur 5·5″.
Bakarganj	..	..	..	..	9th, Gaurnadi 11·0″.
Chittagong	..	..	..	..	9th, Kutubdia 7·3″.
ORISSA (STATES)					
Gangpur	..	..	..	..	13th, Gangpur 5·6″.
BENGAL STATES					
Kailashar	..	..	..	..	12th, Kailashar 5·5″.
EAST RAJPUTANA					
Amber (Jaipur State).	..	..	..	2·1	
Sawai Madhopur (Jaipur State).	..	3·5	..	..	13th, Khandar 7·3″.
Kotah	..	4·1	..	..	13th, Kotah 5·3″.
Baran (Kotah State).	..	3·6	..	..	13th, Antah 5·1″.
Banswara	..	2·3	..	..	
Tonk	..	2·3	..	..	
Bundi	2·8	2·1	..	..	13th, Bundi, 5·1″.
Jalawar	..	3·1	3·8	..	13th, Bhawaniganj 5·4″. 14th, Bhawaniganj 6·1″.
Dungarpur	3·1	..	..	..	12th, Dungarpur 6·9″.
CENTRAL INDIA					
Rampur Bhanpura (Indore State)	..	3·1	2·0	..	
Narsingarh (Bhopal Agency)	..	2·1	..	..	
Malwa Agency	..	2·7	..	..	13th, Sailana 5·0″
Bundelkhand	..	..	..	..	11th Ajaigarh 5·3″.
WEST CENTRAL PROVINCES.					
Hoshangabad	2·1	..	..	..	

12. Deep Bay of Bengal depression from 13th to 20th September 1946.—A trough of low pressure appeared over the north Bay of Bengal on the morning of the 12th. It became more marked on the next morning, when upper winds upto 7,000 feet over south Bengal were east to northeast while those over the Orissa-Circars coast were northwest. The isobaric chart of the 13th morning also showed the movement westward of a low pressure wave from central Burma. The low pressure wave accentuated the trough of low pressure over the north Bay of Bengal and the latter concentrated into a depression by the 14th morning, centred near Lat. 20°N., Long. 89°E. Moving northwards and deepening slightly, the depression crossed the coast at 08 hrs. of the 15th about 50 miles eastnortheast of Saugor Island, Chandbali having reported 8″ of rain during the preceding 24 hours. At 17 hrs., the deep depression was centred about 30 miles east of Calcutta. The wind speed had, by that time increased considerably in the northwest angle of the Bay i.e. the southwestern sector of the depression, Sandheads reporting northwesterly wind of force 6 and Saugor Island westerly wind of force 8, the strong winds continuing to blow for 24 hours. Very heavy rain also fell in Calcutta and Saugor Island during that night. Next morning, the centre of the depression was about 50 miles north of Calcutta. Slightly intensifying further the depression then took a more northwesterly course, and lay with its centre near Berhampur on the 17th morning, after having caused 9″ of rain at Asansol. Next morning it was over Bihar centred near Gaya where there was a westerly wind of force 8 ; weakening rapidly thereafter and moving westnorthwestwards, it lay as a shallow ' low ' over the southeast United Provinces at 08 hrs. of the 19th and moved over to the northeast United Provinces on the 20th morning becoming unimportant thereafter.

Consequent on the formation and movement of this depression widespread and generally severe thunderstorms occurred in northeast India during the period 15th to 19th. The depression was also responsible for widespread rain in the east United Provinces and for very heavy rain over a narrow belt of the country close to its track on the west. According to press reports, several breaches occurred in the East Indian Railway between Gaya and Patna due to the heavy rains while many villages were inundated and standing crops damaged in southwest Bengal, Bihar and the east United Provinces.

The district averages and the more noteworthy amounts of rainfall associated with the depression are given in the following table :

TABLE 11.

District	District averages on 14th	15th	16th	17th	18th	19th	Particularly heavy falls.
ASSAM							
Sylhet	..	..	..	..	..	..	19th, Sunamganj 5·1″.
BENGAL							
24 Parganas	..	..	3·5	..	..	..	15th, Diamond Harbour 9·3″. 16th, Budge Budge 5·8″, Alipore 6·9″. 17th, Budge Budge, 6·9″.
Burdwan	..	..	..	4·7	..	..	17th, Katwa 6·1″, Asansol 10·6″ Mankar 6·5″.
Birbhum	..	..	..	2·4	..	..	17th, Hetampur 7·0″.
Bankura	..	..	2·4	3·5	..	..	16th, Indus 5·1″, Sonamukhi 7·2″ Simhapal 5·5″. Siromanipur 8·0″ Deuli 5·5″ ; 17th, Bankura 7·2″, Kotapur 6·0″, Gangajalghati 6·8″, Indpur 5·9″, Mejhia 7·0″, Palasdanga 10·9″. Chatna 8·0″, Saltona 6·0″, Patresayle 5·3″.
Midnapur	..	..	..	..	..	..	15th, Tamluk 9·0″, Kashiraj 8·3″, Jhargram 6·5″.
Howrah	..	2·0	5·9	2·6	..	..	15th, Howrah 5·3″ ; 16th, Ulubaria 9·8″, Amta 6·5″.
Darjeeling	..	..	..	..	2·9	..	18th, Kurseong 7·0″.
Noakhali	..	..	..	2·0	..	..	

TABLE 11—*contd.*

District	District averages on 14th	15th	16th	17th	18th	19th	Particularly heavy falls.
ORISSA.							
Cuttack	..	..	..	..	..	..	17th, Jaipur 5·0″, Rajkanika 9·5″.
Balasore	..	3·0	2·7	..	..	..	17th, Chandbali 7·7″, Bhadrak 11·4″, Eram (Basudevpur) 5·3″ ; 18th, Balipal 11·5″, Bhograi 13·0″.
BIHAR & CHOTA NAGPUR.							
Gaya	..	..	..	..	2·9	..	16th, Deo 7·3″ ; 17th, Barachati 7·9″ ; 18th-Aurangabad 8·7″ Shergati 9·9″, Nabinagar 8·2″.
Shahabad	..	..	..	..	4·9	..	18th. Bhalina 5·2″, Sasaram 6·7″ Agaon 5·5″, Sikraul 5·1″, Basawan 5·6″, Mansharpur 7·5″, Chand 5·5″, Chenari 5·0″, Kochas 5·5″ Adhaura 7·5″, Baruhi 5·7″, Chouri 7·7″.
Santal Parganas	..	..	..	..	..	..	17th, Sarawan 7·7″.
Hazaribagh	..	..	..	..	3·2	..	17th, Ramgarh 5·0″ ; 18th Barhi 10·4″, Chatra 5·8″, Hunterganj 12·0″.
Ranchi	..	..	..	..	..	..	17th, Bishnupur 5·3″.
UNITED PROVINCES.							
Banaras	..	..	..	..	5·0	3·6	18th, Chandauli 7·6″. 19th, Chandauli 5·1″.
Mirzapur	..	..	..	..	2·7	..	
Jaunpur	..	..	..	..	..	3·3	19th, Jaunpur 5·1″.
Ghazipur	..	..	..	..	4·6	2·1	18th, Mahammadabad 7·8″.
Ballia	..	..	..	..	2·9	2·8	
Gorakhpur	..	..	..	..	..	2·6	
Deoria	..	..	..	..	..	3·1	
Basti	..	..	..	..	..	2·2	
Azamgarh	..	..	..	..	..	2·8	19th, Mahul (Phulpur) 5·7″.

13. Cyclonic Storm in the Bay from the 1st to the 7th October 1946.—The morning chart of the 1st October showed appreciable negative pressure departures and a feeble cyclonic circulation extending upto 3,000 feet over the west Central Bay of Bengal. All stations along the east coast from Calingapatam to Saugor Island were also raining at this time, while some of these stations had already recorded good amounts of rainfall. On the morning of the 2nd, the region of unsettled weather had shifted towards the east Central Bay of Bangal ; the southwesterly upper winds over Port Blair had strengthened considerably while weather had improved along the Orissa coast. The movement of a low pressure area from the east into the Andaman Sea at about the same time could be inferred by the continuous precipitation reported by Bangkok, Mergui and Rangoon on the 1st and 2nd and a rise of pressures at these stations on the 2nd. The low pressure wave apparently moved northwestwards into east Central Bay and accentuated the cyclonic circulation already over that region. By the 3rd morning a depression which was probably deep had formed in the east Central Bay with its centre near latitude 16½°N., and longitude 91°E. S. S. Empire Pride (Position latitude 15°N, longitude 93½°E) reported southerly wind of force 4 and very squally weather while stations along the northeast angle of the Bay were experiencing conti-

nuous rain. The deep depression intensified further and, moving north. northwestwards, was centred near latitude 18½°N., and longitude 89½°E at 08 hrs. of the 4th. It then moved northwards and was centred at 17 hrs. I. S. T. near latitude 20½°N., and longitude 88½°E., probably as a cyclonic storm of small extent. At this time, the pressure departure at Sandheads which was about 30 miles from the centre of the storm was 11·8 mbs. All stations in Bengal and Assam had started raining by this time. The storm crossed the coast just to the east of Calcutta on the 5th morning and widespread rain had occurred over the whole of northeast India during the night and very heavy amounts had fallen in southeast Bengal. Continuing a northerly course and weakening gradually, the depression was centred near Rajshahi on the 6th morning and as a shallow 'low' near Mymensingh on the 7th. Thereafter it became unimportant.

In association with this storm, widespread and locally very heavy rain fell in Bengal and Assam between the 4th and the 7th, while rainfall was also widespread in Bihar and Orissa on the 5th. Some of the noteworthy amounts of rainfall recorded were : Barisal and Faridpur 10″ each in 36 hours ending 08 hrs. of the 6th, Berhampur 6″, Bogra 7″, Mymensingh 8″, Cherrapunji 13″ for 24 hrs. ending 08 hrs. of the 6th. Shillong 12″, Cherrapunji 16″ on the 7th morning. The heavy rainfall resulted in severe floods in the Kamrup and Nowgong districts in Assam and also caused considerable damage to property and crops and dislocation of road and rail transport in the various districts of Assam and Bengal. A few noteworthy extracts from newspaper reports are reproduced below :—

1. A report from Gauhati dated the 12th October 1946, stated :— "Alarming reports of flood in Nowgong district are pouring in. About 120 villages consisting of three lakhs people have been affected".
2. Another report from Gauhati dated the 13th October 1946, stated :— "Over 700 villages, covering an area of 2,000 square miles in the southwest part of Nowgong district, and Dimuria Mauza of Kamrup district have been affected. Of the above mentioned villages about 150 are totally submerged under water, causing indescribable suffering to thousands of people..... It is learnt that normal train services in the affected areas cannot be resumed before the end of this month. The railway lines between Anjari and Chaparmukh have been heavily damaged. Severe floods have made Raha railway bridge unsafe."
3. Report from Kalna (Burdwan) dated the 7th October 1946, stated :—"Kalna is experiencing cyclonic weather, accompanied with incessant rains since Thursday night. Telegraphic communications have been considerably affected. Numerous huts have been blown off and several mud houses have collapsed. Four country boats capsized in the river Bhagirathi.....".

The noteworthy averages and rainfall amounts of particularly heavy falls associated with this storm are given below :—

TABLE 12.

District	District averages on			Particularly heavy falls.
	5th	6th	7th	
ASSAM				
Goalpara	..	2·3	..	
Nowgong	..	2·3	2·4	
Sylhet	..	2·5	4·8	6th, Sunamganj 6·8″. 7th, Sylhet 12·5″, Lallakhal 18·4″, Manumukh 5·7″.
Cachar	..	..	3·3	7th, Barkhola 5·2″.
Garo Hills	..	6·8	2·7	6th, Tura 5·6″, Dalu 8·5″ Mahendraganj 6·3″ ; 7th, Tura 5·5″.
Manipur	..	..	..	8th, Imphal 6·8″.
Khasi and Jaintia Hills	..	3·7	9·0	6th, Upper Shillong 7·3″. 7th, Upper Shillong 6·2″, Shillong 11·7″.
Cachar (north Cachar Hills)	..	2·9	3·9	7th, Haflong 7·1″.
BENGAL				
24 Parganas	2·0	..	..	
Murshidabad	2·0	..	..	6th, Azimgunj 6·4″, Berhampore 6·4″.
Jessore	2·8	..	..	5th, Jessore 6·1″.
Khulna	2·8	..	..	4th, Morelganj 7·5″ ; 5th Khulna 5·7″.
Rajshahi	3·1	3·7	..	5th, Nator 5·0″ ; 6th, Nator 12·0″ 6th, Badalgachi 5·5″.
Rangpur	..	2·3	..	6th, Bhawaniganj (Gaibandha) 10·6″, Kurigaon 6·8″.
Bogra	3·0	2·2	..	5th, Nowkhilla 9·7″. 6th, Bogra 6·6″. Dubchanchia 6·3″.
Pabna	5·8	5·3	..	5th, Shazadpur 5·8″, Pabna 5·9″ 6th, Shazadpur 5·8″, Sirajganj 9·8″.
Dacca	2·3	3·5	..	4th, Nawabganj 8·5″ ; 6th, Munshiganj 5·1″. 6th, Joydepur 7·8″.
Mymensingh	3·6	3·4	..	4th, Jamalpur 5·5″. 5th, Jamalpur 6·0″, Durgapur 5·5″, Dewanganj 5·3″.
Faridpur	3·8	..	..	6th, Kishorganj 7·1″, Netrokona 6·9″. 5th, Faridpur 5·7″, Fatehpur 5·5″.
Bakarganj	5·3	..	..	4th, Barguna 5·4″, Bhola 5·0″. 5th, Patuakhali 13·2″ ; 6th, Patuakhali 8·5″.
Chittagong	2·1	2·6	2·4	5th, Cox's Bazar 5·4 ; 6th Cox's Bazar 5·1″. 7th, Cox's Bazar 5·5″.
Tippera	2·6	4·4	..	6th, Brahmanbaria 5·6″, Nabinagar 5·1″, Sarail 6·3″.
Noakhali	2·1	3·1	..	6th, Feni 7·2″.
EASTERN STATES				
Tripura	2·4	..	..	
Rampur	..	..	..	7th, Rampur 5·5″.
BIHAR				
Santal Parganas	..	..	..	6th, Rajmahal 6·0″.

14. Depression from the 14th to the 23rd October 1946.—On the 14th evening, the upper wind circulation above 3,000 feet and several ships' observations from south Bay suggested that conditions were becoming unsettled over the south Bay of Bengal where the approach of a low pressure wave from the Andaman Sea was also noticeable. On the 15th morning, a trough of low pressure appeared over the southwest Bay and the upper winds upto 7,000 feet showed a cyclonic circulation. The advent of the low pressure wave into the southwest Bay apparently accentuated the seasonal trough of low pressure and the latter became a shallow depression centred at 08 hours of the 16th near latitude 12½°N., and longitude 85°E. Moving in a northwesterly direction, the depression was centred at 08 hours of the 17th near latitude 14°N., and longitude 83°E. It then took a northnortheasterly course and on the next morning, it was centred near latitude 16°N., and longitude 84°E. Thereafter it began to weaken and, in the course of the next 24 hours, became a trough of low pressure off the Circars coast. On the 20th morning, this trough extended from the north Coromandel coast to Chota Nagpur, and after persisting there for two days, it became unimportant by the 22nd.

Under the influence of this depression, fairly widespread rain occurred along the Coromandel coast on the 16th and 17th and widespread rain with a few heavy falls on the Circars coast between the 17th and 19th. Widespread thunder rain with locally heavy falls also occurred in northeast India and the east United Provinces from the 17th to 20th and in East Bengal and Assam from the 21st to 23rd.

The follcwing table gives the noteworthy district averages and amount of particularly heavy falls of rain.

TABLE 13.

District	District averages on							Particularly heavy falls.
	17th	18th	19th	20th	21st	22nd	23rd	
ASSAM								
Goalpara	..	..	..	2·8	3·0	..	..	
Sibsagar	..	..	1·5	..	..	..	..	
Sylhet	..	..	..	..	2·3	2·1	..	21st, Baikunthapur 5·4". 22nd, Sylhet 5·4".
Garo Hills	..	..	2·9	3·2	2·6	..	..	
Khasi Hills and Jaintia Hills	..	..	..	..	2·9	2·7	..	
NORTH BENGAL								
Rajshahi	..	..	1·7	1·8	..	..	..	20th, Noagaon 5·0".
Dinajpur	..	..	1·7	3·1	..	..	..	20th, Dinajpur 5·3".
Jalpaiguri	..	..	..	2·9	..	..	..	
Darjeeling	..	..	2·0	..	..	..	..	
Rangpur	..	..	2·2	4·5	1·7	..	..	20th, Rangpur 5·5" Bagdogra 6·0" Saidpur 10·9".
Pabna	3·3	..	2·9	1·6	..	..	3·3	
Malda	..	..	1·5	..	1·5	..	..	
SOUTHEAST BENGAL								
Dacca	..	..	1·9	..	..	..	..	19th, Nawabganj 7·0".
Mymensingh	..	..	1·6	2·3	2·7	..	..	21st, Jamalpur 6·5".
Bakarganj	1·5	..	1·8	..	..	..	..	
Tippera	..	..	..	..	1·8	2·6	..	
Noakhali	..	..	..	..	1·6	1·9	..	
SOUTHWEST BENGAL								
24 Parganas	..	..	..	1·9	..	..	..	
Murshidabad	..	..	..	1·9	..	..	..	
Jessore	..	..	..	2·2	..	..	..	
Howrah	..	..	..	1·5	..	..	..	
Birbhum	..	..	..	..	..	..	..	21st, Labpur 5·0".
ORISSA								
Cuttack	..	..	2·4	..	..		..	
Balasore	.	3·6	1·9	..	..	..	..	18th, Baliapal 14·6" Bhograi 8·0".
Puri	..	2·2	2·6	..	..	..	..	19th, Khurda 5·3", Banpur 5·0".
Ganjam	..	..	2·2	..	..	..	..	17th, Surada 6·2", 19th, Aska 5·2".
CHOTA NAGPUR								
Santal Parganas	..	..	1·6	..	..	..	..	
Hazaribagh	..	..	..	..	..	..	..	19th, Dumri, 5·8".
BIHAR								
Bhagalpur	..	..	2·2	1·5	..	..	..	20th, Banka 5·1", Amarpur 5·4".
Purnea	..	..	..	2·0	..	..	..	18th. Gandwara 5·0".
UNITED PROVINCES								
Azamgarh	..	1·7	..	..	..	..	..	
Bahraich	..	..	..	2·2	..	..	..	20th, Nanpara 5·3",
MADRAS								
Vizagapatam	..	..	..	..	..	..	..	19th, Gajapathinagaram 5·2".

15. Cyclonic Storm of the 30th October to the 7th November 1946.—On the morning of the 30th October, the upper winds over Port Blair upto 3,000 feet had strengthened to force 6 to 7 and ships in the south Bay were reporting overcast skies and occasional squalls. Weather was disturbed in the southeast Bay and adjoining parts of the Andaman Sea. On the 31st morning Port Blair was reporting easterly surface winds of force 4 and rain, while a ship at latitude 11½°N., and longitude 90½°E. reported eastsoutheasterly winds of force 6 with frequent squalls. The upper winds along the Coromandel coast were northeast or north while winds over Colombo and Matara were northwest to west up to 3,000 feet showing that a cyclonic circulation was established. By 17 hrs. of the same day a depression had formed with centre near latitude 9½°N and longitude 88½°E. At this time several stations in Ceylon and along the Coromandel coast were raining. Madras was reporting rough seas and northerly surface wind of force 6 and the cyclonic circulation had extended to 7,000 feet. The depression moved westnorthwestwards and was centred at 08 hrs. I. S. T. of the 1st November near latitude 10°N and longitude 86°E. It deepened during the night and was close to the coast just south of Negapatam at 08 hrs. of the 2nd. Negapatam was having at that time a negative pressure departure of 5·8 mbs. and was reporting rough seas and eastsoutheasterly wind of force 6. The whole of the Peninsula south of a line from Nellore to Mangalore was raining, with heavy continuous precipitation in the eastern half. Heavy rain had also been recorded along the Coromandel coast and in the interior, Negapatam reporting 5" and Trichy 4". After crossing the coast, the deep depression weakened and, moving westwards across the Peninsula, emerged into the Arabian Sea off Malabar in the early hours of the 3rd. Curving to the right on emerging, the depression was centred near latitude 12°N., and longitude 74°E at 08 hrs. of the 3rd. It then took a northnorthwesterly course, again became deep, and was centred near latitude 15½°N. and longitude 71°E. on the 4th morning. By that time, a cloud belt had appeared extending from the north Bombay Deccan to the north Central Provinces indicating that the depression was likely to recurve towards east in course of time. It then intensified into a cyclonic storm of small extent centred near latitude 17½°N., and longitude 71°E at 17 hrs. on the 4th. At this time, all along the south Konkan coast, the seas were rough to very rough and the winds had strengthened considerably ; Bombay which was 150 miles away from the centre of the storm was experiencing south southeasterly wind of force 7. The pressure deficiency at the centre of the storm at this stage was probably 8 mbs. The storm moved more or less northwards and was showing signs of weakening on the 5th morning and on that day it was lying as a deep depression near latitude 18½°N., and longitude 71°E. It then curved towards northeast thereafter and, weakening at the same time, crossed the coast between Bombay and Dahanu at 10 hrs. on the 8th. Weakening progressively it lay as a low pressure area over the north Bombay Deccan and Berar on the evening of the 7th and became unimportant during the course of the next 24 hours. In association with this storm, widespread rain with locally heavy falls occurred in the south Peninsula, the Konkan, the west Deccan and Gujarat while widespread rain also occurred in west Central India, the west Central Provinces and southeast Rajputana. The noteworthy district averages and the particularly heavy falls of rain associated with the storm are given in the following table :

TABLE 14.

District	District averages on 6th	Particularly heavy falls.
CENTRAL INDIA		
Goona (Gwalior State)	2·6	
CENTRAL PROVINCES		
Nimar	2·5	
Betul	2·3	
Chhindwara	2·0	
BOMBAY		
Surat	2·1	6th, Surat 5·8".
Thana	..	6th, Dahanu 6·0".
Sachin (State)	..	5th, Sachin 5·3".
MADRAS		
Trichinopoly	..	2nd, Lalgudi 5·3".
Nellore	..	3rd. Ongole 5·8"

(Data for the whole of Madras and for some districts in Bombay for November not available).

16. Cyclonic Storm of the 5th to the 11th November 1946.—On the morning of the 5th November the upper winds over Port Blair were east-southeasterly, force 6 to 7, upto 3,000 feet while those over Ceylon were strong northwesterlies. On the surface chart, a feeble cyclonic circulation could be located in the southeast Bay of Bengal and adjoining parts of the Andaman Sea. Thus weather was unsettled in southeast Bay and the neighbourhood, and by the 6th morning, a depression formed with centre at 08 hrs. near latitude 09°N., and longitude 88°E. Moving in a westnorthwesterly direction, and intensifying at the same time, the depression lay with its centre near latitude 10°N., and longitude 85°E at 08 hrs. of the 7th. Stations along the north Coromandel coast started raining on the morning of the 7th. The deep depression thereafter moved northwestwards and on the 8th morning, its centre was about 150 miles east of Madras. The rainfall had by that time extended to the Circars and south Orissa coasts and the negative pressure changes and pressure departures had become maximum at Nellore. Continuing to move northwestwards, the deep depression probably intensified into a cyclonic storm by the 8th evening. The pressure deficiency at the centre of the storm at this stage is estimated to have been about 8 mbs. The storm crossed the coast near Nellore during the same night and lay as a depression over the Madras Deccan with centre near Guntakal on the next morning. Very heavy rain fell during this period along the north Madras coast and in east Hyderabad, Ongole and Masulipatam reporting 6 inches each at 08 hrs. on the 9th. Moving westwards across the Peninsula, the depression emerged into the Arabian Sea off the north Kanara coast and was centred at 08 hrs. of the 10th about 150 miles west of Marmagao. It then moved northwards and its centre was near latitude 18½°N., and longitude 72°E at 08 hrs. of the 11th. Thereafter, it weakened rapidly and passed inland north of Bombay as a low pressure wave on the morning of the 12th.

In association with the formation and movement of this strom, widespread and locally heavy rain occurred in the Madras Presidency outside Malabar, in the Deccan, the Konkan and the Central Provinces.

The noteworthy district averages and particularly heavy falls of rain associated with the storm are given below :

TABLE 15.

District	Particularly heavy falls
MADRAS	
Madras . .	8th, Madras 7·5″.
Nellore . . .	8th, Nellore 9·5″ ; 9th, Ongole 5·6″.
Kistna . . .	9th, Masulipatam 6·0″.

(Data for the whole of Madras and for some districts in Bombay for November not available).

17. Cyclonic Storm of the 14th to the 21st November 1946.—On the 13th morning, weather became unsettled in the southeast Bay of Bengal from where ships reported overcast skies and rain while Port Blair was reporting easterly surface wind of force 6 and moderate continuous rain. The unsettled conditions were more marked in the course of the day and by the 14th morning had extended to the southwest Bay of Bengal. Pressures had started falling along the Coromandel-Circars coast by the 14th evening and the upper winds upto at least 3,000 feet showed a cyclonic circulation. A depression had formed with its centre at 17 hrs. I. S. T. near latitude 09°N., and longitude 86°E. S. S. Jalakrishna at latitude 12°N., and longitude 85°E., was reporting easterly squally wind, force 6, and rain, while S. S. Jalaganga at latitude 12°N., and longitude 89°E., reported southsoutheasterly wind of force 4. Stations along the west and south coast of Ceylon were raining on the 14th evening suggesting that there was a good indraught of maritime air into the depression. The depression deepened and was centred at 08 hrs. of the 15th near latitude 10°N., and longitude 83°E. By this time, rain had commenced at all stations along the Coromandel coast. The pressures had fallen further, the fall being maximum at Cuddalore and Negapatam and between 08 hrs. and 17 hrs. of the 15th, Negapatam and Cuddalore recorded 4 inches of rain each. At 17 hrs., the deep depression was lying near latitude 11°N., and longitude 81°E. ; at that time, Negapatam had a negative pressure departure of 7·3 mbs. The rain belt had by then extended into the interior of southeast Madras and Mysore and the coastal stations from Madras to Pamban were reporting rough seas and strong winds. Ships in the northeast sector of the depression were experiencing strong winds and rough to very rough seas during that night. The deep depression intensified into a cyclonic storm for a short while before crossing the coast between Cuddalore and Negapatam about midnight of the 15th. Under the influence of the storm, Madras experienced gales of 30-40 m.p.h., from the afternoon of the 15th till the early hours of the 16th. Moving westwards, the storm weakened into a depression and was centred 40 miles south of Mysore (city) at 08 hrs. on the 16th. It emerged into east central Arabian Sea during the night and at 02 hrs. of the 17th had its centre near latitude 13°N., and longitude 73½°E. By 08 hrs. of the same day the depression had again deepened and was probably a cyclonic storm centred near latitude 13½°N., and longitude 73°E. The storm moved north-northwestwards and was centred near latitude 15½°N., and longtitude 72½° E. at 17 hrs. of the 17th. A cloud belt which had appeared over the north-Bombay Deccan, the west Central Provinces and west Central India became more noticeable by 17 hrs. of the 17th indicating the possible recurvature eastwards of the storm. By 02 hrs. of the 18th, the storm began recurving towards northeast and at 08 hrs. was lying about 100 miles southsouthwest of Bombay. Stations along the south Konkan coast experienced continuous rain from the 17th evening and the rainfall extended to the north Konkan and the Bombay Deccan in the course of the night. Rough seas and squally winds commenced along the south Konkan coast in the early hours of the 18th and continued throughout the day. At 17 hrs. of the 18th the storm was about to cross the coast near Alibag. Strong and squally winds commenced at Bombay by 10 a.m. of the 18th and at 18 hrs. the wind speed reached a maximum of 52 m.p.h. From the microseisms of storm-type recorded by the Colaba Observatoty on the 18th, it appears that probably the storm had reached its maximum intensity by 15 hrs. of that day after which it began to weaken slowly.

The storm crossed the coast at about 19 hrs. and rapidly weakened into a depression which lay with its centre about 40 miles north of Ahmednagar on the morning of the 19th. Very heavy rain had fallen in the south Konkan, the Bombay Deccan and northwest Hyderabad by 08 hrs. of the 19th. Moving rapidly in a eastnortheasterly direction and weakening further, the depression lay between Raipur and Sambalpur on the morning of the 20th. It emerged into the northwest angle of the Bay of Bengal on the 21st morning and filled up by the same evening.

The storm was accompanied by widespread heavy rainfall all along its track. According to newspaper reports a number of fishing vessels and a few countrycraft got lost in the storm along and off the south Konkan coast. The Dutch Liner Bossevian picked up eight men and a child, survivors of a countrycraft wrecked about 150 miles off the Bombay coast, while a number of people who were in the sea in that area could not be rescued due to the mountainous seas. Very heavy rain in the Ahmednagar District is reported to have caused considerable damage to property and crops. In the south, the railway line between Trichinopoly and Madura of the South Indian Railway was breached at a number of places on account of the heavy rain accompanying the passage of the storm over that area.

The district averages and noteworthy amounts of heavy rainfall associated with the storm are given in the following table.

TABLE 16.

District	District averages on		Particularly heavy falls.
	19th	20th	
CENTRAL PROVINCES			
Akola . . .	1·5	..	
Buldana . . .	2·8	..	
Amraoti . . .	..	2·0	
Southern Rewa State .	..	1·9	
Jubbulpore . .	..	1·5	
Mandla . . .	..	2·1	
Bhandra . . .	..	1·6	
Balaghat . . .	..	1·8	
Hoshangabad . .	..	1·7	
Betul . . .	..	2·3	
Chhindwara . .	..	2·4	
Nagpur . . .	.	2·2	
HYDERABAD			
Aurangabad . .	..	..	19th, Aurangabad 6·2″

TABLE 16—*contd.*

District	District averages on 19th	District averages on 20th	Particularly heavy falls.
BOMBAY			
East Khandesh . .	2·8	..	19th, Chalisgaon 6·1″.
Nasik . . .	2·4	..	
Ahmednagar . .	3·3	..	19th, Shevgaon 5·1″, Nevasa 5·9″ Rahuri 6·1″, Akola 5·7″.
Poona . . .	3·3	..	19th, Ghoda 5·9″, Junnar 7·5″.
Satara . . .	..	..	19th, Panchgani 7·0″.
MADRAS			
Nellore . . .	..	..	17th, Ongole 10·2″.
North Arcot . .	..	..	16th Vellore 5·0″.
Trichinopoly . .	..	..	16th, Jayankondam 6·4″.

18. Shallow Bay depression of the 2nd to the 4th December and deep depression of the 6th to the 11th December 1946.—Following a spell of moderate to strong northeast monsoon, weather became unsettled in the southwest Bay of Bengal on the 2nd December and by that evening a well marked trough of low pressure appeared over the southwest Bay of Bengal off Ceylon. By the next morning this trough concentrated into a shallow depression centred near latitude 11½°N., and longtitude 81½°E. The depression moved westwards and crossed the coast near Cuddalore on the morning of the 4th. Unsettled conditions however, persisted in the Bay of Bengal off the Coromandel coast and the neighbourhood for the next two days and the weather continued to be squally there. In the meantime, a fresh low pressure wave moved into the south Bay of Bengal from the Andaman Sea and the weather again became markedly unsettled in the southwest Bay and the adjoining areas on the 5th morning. On the 6th morning, a depression formed with central region near latitude 11°N., and longitude 86°E. The depression moved westnorthwestwards initially, and was centred near latitude 12°N., and longitude 83°E on the morning of the 7th and near latitude 12½°N. and longitude 82½°E., on the 8th morning. Thereafter it curved towards northeast and, on the 9th morning it was centred near latitude 14½°N. and longitude 83½°E. It continued to move rapidly northeastwards and, intensifying slightly at the same time, it lay as a deep depression centred near latitude 19½°N., and longitude 90°E., on the morning of the 10th. Thereafter it weakened into a trough of low pressure extending over the north and the central Bay of Bengal on the 11th morning.

In association with these two depressions, widespread rain fell in the Peninsula south of latitude 13°N. from the 1st to the 9th, rainfall being locally heavy along the coastal districts of southeast Madras. Widespread and locally heavy rain also occurred along the Chittagong coast on the 10th and 11th. The district averages and some of the noteworthy amounts of heavy falls are given in the following table :

TABLE 17.

District	District averages on 10th	District averages on 11th	Particularly heavy falls.
BENGAL			
Chittagong . .	2·3	2·3	10th, Kutubdia 6·0″. 11th, Cox's Bazar 4·6″.
MADRAS			
Chingleput . . .	..	..	4th, Maduranthakam 6·3″. 1st, Ponneri 6·7″, 7th, Ponneri 6·2″.
South Arcot . .	..	..	3rd, Cuddalore 4·3″. 4th, Cuddalore 4·0″.

(Provincial Rainfall tables for Madras not available.)

WINDS OF FORCE NINE OR MORE IN INDIAN SEAS.

Excluding dates of storms and depressions, a description of which has been given above, winds of force nine or more were recorded on ships in the Indian seas during the year 1946 on the following occasions :—

TABLE 18.

Date	Name of ship	Approximate position. Lat. N.	Long. E.
		°	°
10th June . . .	S. S. Empress of Auckland .	12	57
21st June . . .	S. S. Loch Achray . .	11	62
22nd June . . .	S. S. Duke of York . .	12	55
26th June . . .	S. S. Jalajyoti . . .	13	74
29th June . . .	S. S. Loch More . .	12	59
30th June . . .	Name not known . .	13	56
1st July . . .	S. S. Colosses . . .	10	54
3rd August . . .	S. S. Ranchi . . .	17	64
3rd August . . .	S. S. Ranchi . . .	17	62
4th August . . .	S. S. Ranchi . . .	16	60
4th August . . .	S. S. Ranchi . . .	16	58
10th August . . .	S. S. Swift Sure . . .	12	55

II. ACCOUNT OF WESTERN DISTURBANCES DURING 1946.

The majority of the western disturbances which affected the weather over India during 1946 were feeble and confined their activity to the extreme north of the country except in February and March when some moderately active disturbances in association with their secondaries caused fairly widespread thundershowers in northwest India, the United Provinces, the central parts of the country and northeast India. A few of the disturbances in May were also responsible for severe dust storms in the United Provinces and violent nor'westers in Bengal.

A list of 46 disturbances, classified according to the nature of precipitation caused by them is given in the table below. Descriptions of some important disturbances are also added.

TABLE 19.

Nature of precipitation.	Number of western disturbances.											
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	No	Dec.
Widespread .	1	2	3	2	2	1	..	..	..	1	..	1
Local . .	1	1	1	2	5	3	..	..	..	..	1	..
Little or nil .	4	3	2	1	1	1	..	..	..	3	..	4
No. of disturbances in each month . .	6	6	6	5	8	5	..	..	..	4	1	5

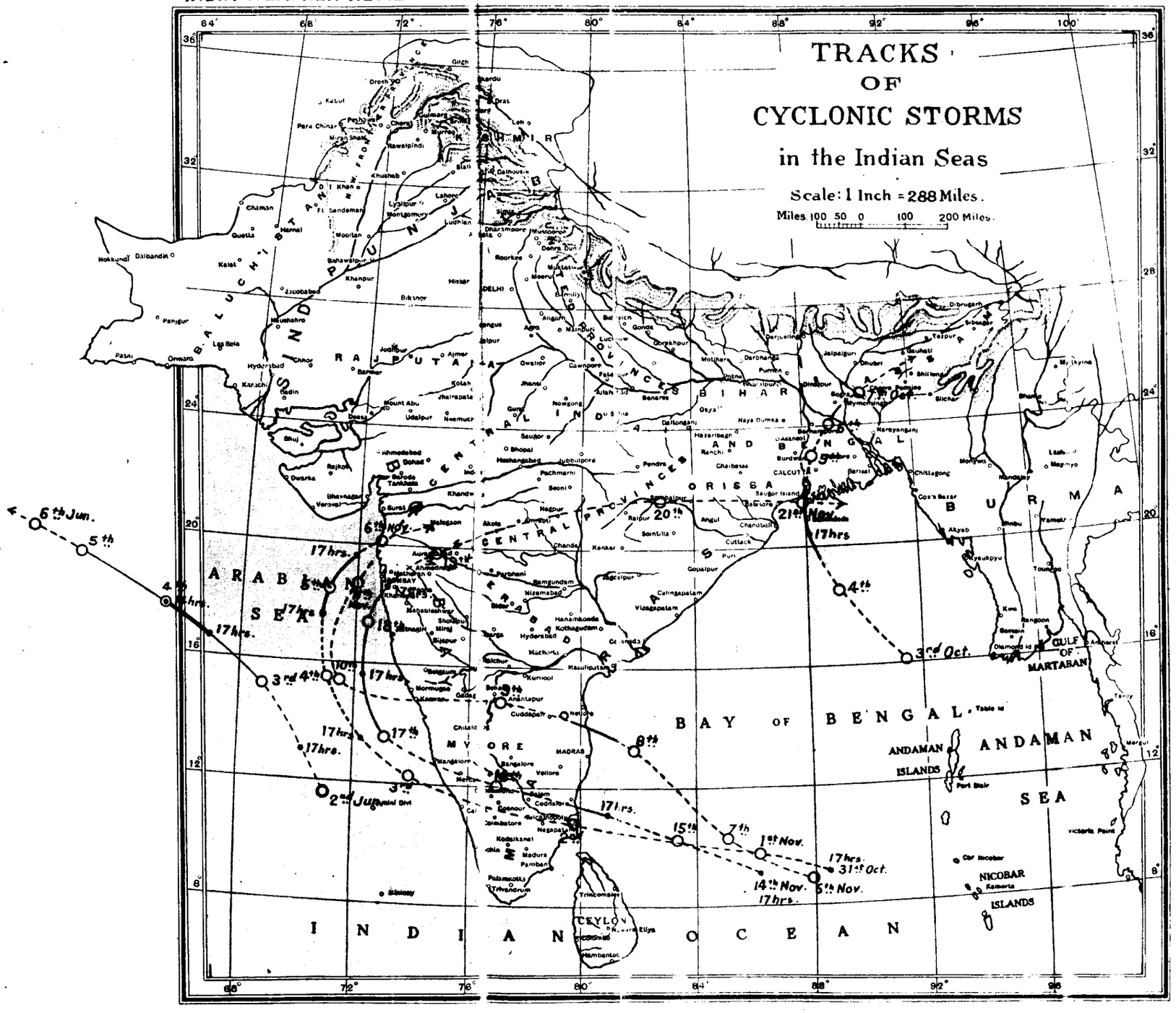
1. Western disturbance of 21st to 23rd February 1946.—A western disturbance approached the northwest frontier on the 21st and lay as a low pressure area over the Punjab on the 22nd. It weakened on the next day, but induced a secondary low over west Central India. The latter persisted for 2 days without appreciable motion and became unimportant. In association with these low pressure areas, widespread rain occurred in the North-West Frontier Province, Kashmir, the east and north Punjab, east Rajputana, the United Provinces and west Central India from the 22nd to the 24th. The moist air brought in by the system was responsible for widespread thunderstorms in Chota Nagpur, Bihar and north Bengal on the 24th and 25th.

2. Western disturbance of the 20th to the 25th March 1946.—On the 20th morning a western disturbance began affecting north Baluchistan and the south North-West Frontier Province, and on the next morning it lay as a low pressure area over the southwest Punjab and passed away across the west United Provinces hills on the 24th. It induced a low pressure area over Chota Nagpur and the neighbourhood on the 24th which became unimportant over north Bengal by the 26th morning. These two low pressure systems were responsible for nearly general precipitation in the North-West Frontier Province, Kashmir and the Punjab Hills from the 20th to 23rd and an intensification of the thunderstorm activity over northeast India from the 23rd to the 25th.

III. LOCAL STORMS.

Some of the noteworthy local storms reported in newspapers are given below :—

S. No.	Place	Date	Time	Classification of storm	Loss of human life	Remarks.
1	Sunamganj sub division (Assam).	March 23rd .	..	Tornado	3	About 50,000 people in thirtyfive villages were rendered homeless as a result of the tornado. The boro paddy crop was completely destroyed.
2	South Sylhet (Assam) .	Reported on 28th March.	..	Thunderstorm accompanied by hailstorm.	..	The storm damaged boro paddy and mango crops. Several houses collapsed injuring some of the occupants.
3	Sylhet (Assam), Mymensingh and Khulna districts (Bengal)	March 30th, 31st	..	Hail storms and heavy squalls.	several .	Hailstorm and squalls swept over many places in Bengal and Assam. Several lives were lost, houses blown away and crops damaged.
4	Faridpur (Bengal) . .	March 30th .	night .	Heavy thunderstorm .	2	The storm uprooted many trees and razed a number of houses to the ground. It also caused serious damage to mango crops and harvested winter crops.
5	Puri district (Orissa) . .	April 1st . .	..	Squall . . .	9	Nine persons died and forty were injured when the storm passed over Puri district. Many houses were damaged.
6	Banaras (U. P.) . . .	April 8th . .	night .	Heavy thunderstorm .	4	The storm resulted in the breakdown of communications with the neighbouring towns and the failure of electrical installations. Much damage to telegraph and telephone wires were caused by falling trees.
7	Calcutta (Bengal) . .	April 9th . .	night .	Severe dust storm .	1	The storm was accompanied by a 60 m.p.h. squall and lasted for 10 minutes.
8	Jubbulpore . . .	April 11th . .	night .	Severe dust storm .	..	The storm caused serious damage to mango crops and harvested winter crops.
9	Nainital and Farrukhabad districts (U. P.)	2nd and 3rd weeks of April.	..	Severe hailstorms .	..	Caused heavy damage to crops.
10	Raxaul (Bihar) . . .	Reported on 12th April.	..	Severe hailstorm .	some persons	Roofs of houses were ripped up and tossed away and a large number of trees were uprooted.
11	Nagpur (C. P.) . . .	April 19th . .	..	Hailstorm accompanied by rain.	..	Low lying areas were flooded.
12	Dharwar (Bombay) . .	April 24th . .	..	Thunderstorm with heavy rain.	2	Several old houses collapsed and trees and electric poles were uprooted.
13	Calcutta (Bengal) . .	May 1st .	night .	Severe thunderstorm .	..	The wind reached a record speed of 80 m.p.h. Tramway communications were interrupted. Several low lying areas were flooded. A few people suffered minor injuries.
14	Khulna (Bengal) . .	May 1st . .	..	Heavy thunderstorm .	6	A number of boats sank in the Chunkuri and Jnap Jnapa rivers as the storm passed over the areas. Six men were drowned. The storm also damaged several paddy fields.
15	Ramgiri Thana—Noakhali (E. Bengal).	May 5th . .	noon .	Tornado . . .	1	The tornado caused considerable damage. A student was killed and nine others were seriously injured when a 'Madrassa' collapsed.
16	Lucknow (U. P.) . .	May 21st . .	afternoon .	Blinding dust storm .	..	The storm paralysed all traffic. The falling of uprooted trees broke telegraph and telephone wires, thus isolating Lucknow from the neighbouring towns.
17	Coimbatore (Madras) . .	Reported on May 22nd.	..	Violent squall . .	1	The squall of velocity over 45 m.p.h. struck Coimbatore air-field and heavily damaged the hangars of the Fleet Air Arm. The loss was estimated at several lakhs of rupees.
18	Calcutta (Bengal) . .	May 23rd . .	..	Rain storm . . .	..	Five persons were injured by a hut collapsing, four when the chimeny of a glass factory crashed on them, while some more were injured by being hit by flying sheets of iron.
19	Poona (Bombay) . .	May 28th . .	Evening .	Severe thunderstorm with a 60 m.p.h. squall.	2	The telephone communication channel between India and overseas as well as the trunk telephone service between Poona and Bombay were cut. Flying pieces of masonry killed a woman and a boy on the road.
20	Jajmau, Cawnpore (U. P.) .	May 28th . .	Evening .	Severe squall . .	6	A boat carrying nearly 20 passengers was overturned by the storm and capsized in the Ganges drowning 5 women and a child.
21	Upper Sind .	June 2nd . .	Evening .	Heavy dust storm .	..	A number of old trees were uprooted and some buildings damaged. The mango crop was considerably affected.
22	Poona (Bombay) . .	Sep 29th . .	Evening .	Hailstorm with squall .	..	The storm was accompanied by a 54 m.p.h. squall and lasted for 5 minutes. It uprooted about 60 avenue trees, completely interrupted as many as 16 trunk lines, damaged several electrical installations and gardens.
23	Chandpur (East Bengal) .	Reported on Oct. 9th.	afternoon .	Tornado . . .	1	The tornado lasted a few minutes uprooting big trees and blowing away 'Katcha' houses. One person was killed and several injured.



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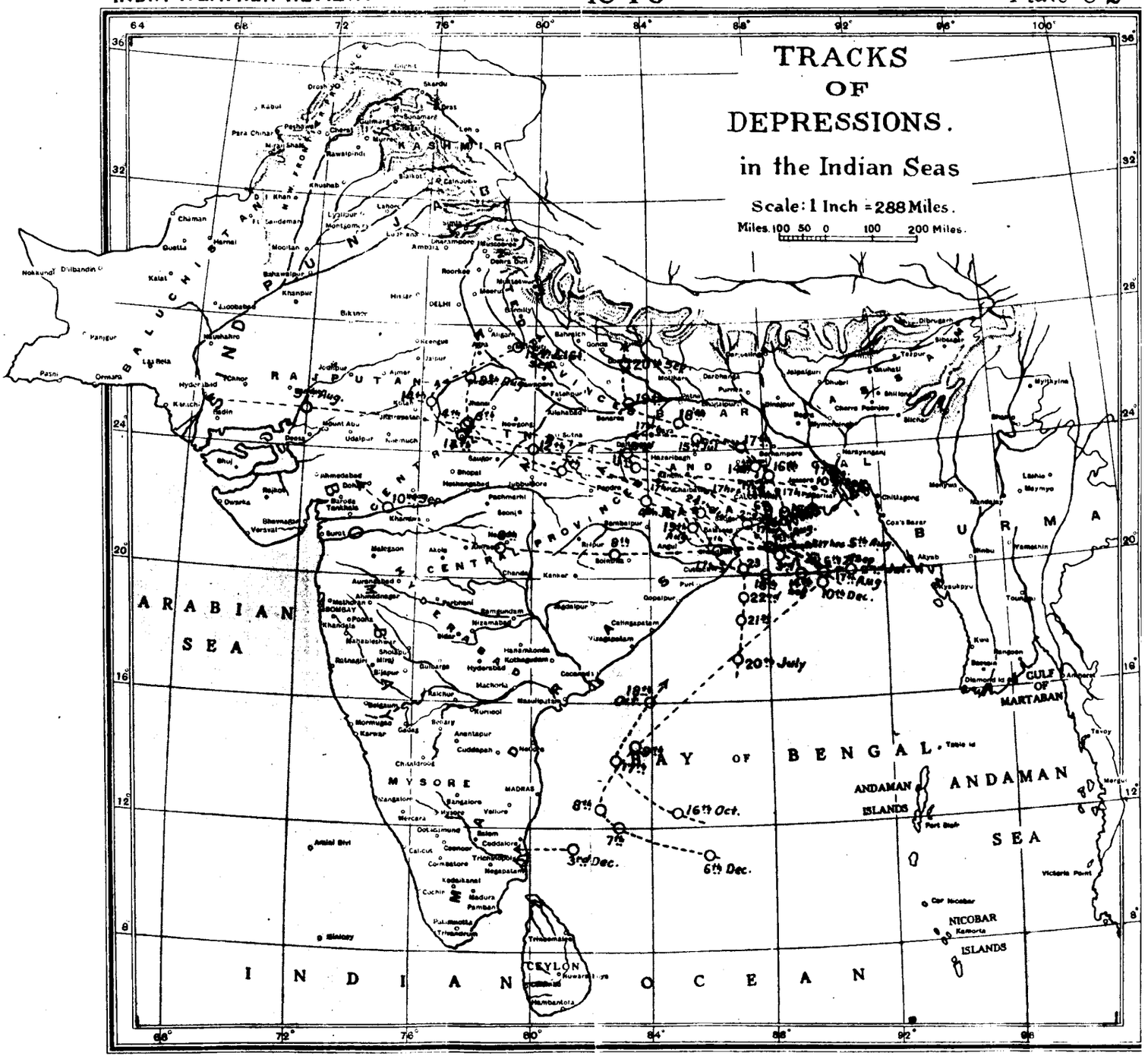
---------- Depression. ———— Storm ▬▬▬▬ Severe Storm



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Instructions to Observers at the 2nd and 3rd class observatories, edition 3 (1943). Re. 1-10 or 2*s.* 6*d.*	Departmental.
Cloud Atlas, 3rd edition (1945) Rs. 2-2 or 3*s.* 6*d.*	Ditto.
Tables for the Reduction of Meteorological Observations in India. Reprint of 3rd edition (1947).	Ditto.
Relative Humidity Tables (1937). As. 7 or 9*d.**	Ditto.
Saturation Temperature Tables (1942). As. 10.	K. N. Rao.
Hygrometric Tables (1,000 mb). 1944. As. 14 or 1*s.* 3*d.*	Departmental.
Hygrometric Tables (900 mb). edition 2 (1948). Price Rs. 1-14-0 or 2*s.* 9*d.*	Ditto.
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Hygrometric Tables—Vapour Pressure.	Ditto.
Handbook of Cyclonic Storms in the Bay of Bengal for use of Sailors.	Sir John Eliot.
Vol. I Text 2nd Edition (1900). Rs. 4.*	
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Handbook of Cyclonic Storms in the Bay of Bengal (Abridged) 1943.	Ditto.
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Cyclone Memoirs—	
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Part II. Bay of Bengal Cyclone of August 21st to 28th, 1888, (1890). Rs. 3.	Ditto.
Part III. Bay of Bengal Cyclones of September 13th to 20th and October 27th to 31st, 1888 and Arabian Sea Cyclone of November 6th to 9th, 1888. (1890) Rs. 5.	Ditto.
Part IV. An enquiry into the nature and course of storms in the Arabian Sea and a catalogue and a brief history of all recorded storms in the Arabian Sea from 1848—1889. (1891). Rs. 3.	W. L. Dallas.
Part V. Account of three cyclones in the Bay of Bengal and Arabian Sea during November 1891. (1893.) Rs. 3.*	Sir John Eliot.
Report of the Midnapore and Burdwan Cyclone of the 15th and 16th of October 1874. (1875) Rs. 3.*	W. G. Wilson.
Report of the Vizagapatam and Packergunge Cyclones of October, 1876 (1877) Rs. 3.*	Sir John Eliot.
Report on the Madras Cyclone of May, 1877. (1879) Rs. 3.*	Ditto.
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Climatological Atlas of India, (1906) Rs. 27.*	Sir John Eliot.
Meteorological Atlas of the Indian seas and the north Indian Ocean. (1908) Rs. 13.*	W. L. Dallas.
Climatic Charts of India and Neighbourhood for Meteorologists and Airmen, (1943).*	Departmental.
Climatological Atlas for Airmen, 1943—Rs. 5-2 or 8*s.*	Ditto.
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* Out of Print.

† Copies for the years 1875, 1876, 1878 to 1881, 1884, 1887 and 1890 are out of print.

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